

**REMARKS****I. Status of the Claims**

Claims 1-19 were pending in the application as of the Final Office Action. New claims 20-28 were presented in the Response to the Final Office Action, but the Examiner refused entry of new claims 20-28.

In the amendments above, Applicants have cancelled claims 10, 11, 14 and 17-19 without prejudice to Applicants' right to pursue the subject matter of those claims in one or more other applications. Applicants have added new claims 20-31 in the amendments above. Applicants request entry of the amendments and examination of the application.

A fee transmittal form filed by Applicants with the response to the Final Office Action provided the required fees for additional claims 20-28. Thus, Applicants believe that only the required fees for new claims 29-31 are now required. However, if this is incorrect, as indicated on the attached Fee Transmittal, any additional required fees may be charged to the deposit account listed on the Fee Transmittal.

**II. Support for New Claims 20-31**

Support for each of new claims 20-31 may be found in the specification and claims as originally filed.

New claim 20 closely tracks the language recited in original claim 10 but is written in a format that is more familiar to the Patent and Trademark Office. New claims 21-24 each depends from claim 20 and defines subject matter similar to original claims 10 and 11.

New claim 25 closely tracks the language of original claim 14 but is written in a format that is more familiar to the Patent and Trademark Office. New claims 26-28 each depends from claim 25 and defines subject matter similar to claims 17-19, respectively.

Each of new claims 29 and 30 is very similar to claim 2. New claims 29 and 30 have been added because the Examiner indicated in the Advisory Action that an independent claim

having the elements of claim 2 would be allowable (see page 6, first full paragraph of the Advisory Action).

Support for new claim 31 may be found, for example at page 3, lines 1-7, at page 3, lines 15-26, and at page 4, lines 1-16 of the specification.

### **III. 101 Rejection**

In the Final Office Action, the Examiner rejected each of claims 10, 11, 14 and 17-19 under § 101. This rejection was reaffirmed by the Examiner in the Advisory Action. Applicants traverse the rejection.

As discussed in the Response to the Final Office Action, the threshold requirement for patentability under 35 U.S.C. § 101 is very low, and “anything under the sun that is made by man” meets the utility requirement. See *Diamond v. Chakrabarty*, 447 U.S. 303, 309, 206 U.S.P.Q. 193, 197 (1980). Thus, Applicants believe that each of claims 10, 11, 14 and 17-19 meets the utility requirement of 35 U.S.C. § 101.

Notwithstanding the traversal of the rejection, to advance issuance of the case Applicants have cancelled each of claims 10, 11, 14 and 17-19 without prejudice to Applicants’ right to pursue the subject matter of those claims in another application. Accordingly, the rejection is overcome.

### **IV. Each of Claims 1, 3, 7 and 8 is Patentable over Harmer**

Claims 1, 3, 7 and 8 are rejected under § 102(b) over Harmer (US 5,824,622). The Examiner asserts (pages 4-5 of the Final Office Action and page 3 of the Advisory Action), that the process steps of Harmer, and in particular the steps disclosed in example 2, are exactly the same as the steps recited in instant claim 1. The Examiner also asserts that the process steps of Harmer inherently form interpenetrating organic and inorganic networks. Applicants disagree and respectfully traverse the rejection.

Harmer does not disclose, teach or suggest the subject matter of claim 1 or any of its

dependent claims. That is, Harmer fails to disclose, teach or suggest a process for production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by (1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds; (2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and (3) drying the gel. Thus, claim 1 is patentable over Harmer.

The Examiner asserts (see page 3, second and third full paragraphs of the Advisory Action) that addition of HCl will inherently change the pH of the solution and that the change in pH causes gel formation. Applicants disagree with the Examiner.

Example 2 of Harmer does not simply involve addition of HCl. Instead, in Example 2 of Harmer a first solution of Nafion and NaOH is prepared and a second solution of tetramethoxysilane, water and HCl is prepared. The first and second solutions are added together with rapid stirring and then left to stand. No gelation occurs until after the solution stands. See Column 14, lines 41-52. Thus, even if addition of HCl in Harmer does result in a change in pH, gelation does not occur until standing. Accordingly, the rejection is improper.

The Examiner also asserts (see page 3, last paragraph of the Advisory Action) that the organic component of example 2 of Harmer will inherently be part of the network. Applicants disagree with the Examiner.

If the Examiner wishes to rely on inherency, the Examiner must provide actual objective evidence showing that an organic network is necessarily present. Even assuming *arguendo* that the organic component is part of the network, this does not necessarily mean that any organic network exists, *i.e.*, it is equally possible, if not more likely, that the organic component of Harmer could be trapped in a network and not be a network itself. Because

claim 1 recites subject matter directed to interpenetrating organic and inorganic networks, and because the Examiner has not provided any extrinsic evidence that indicates any interpenetrating organic and inorganic network is necessarily present in Harmer, the rejection is improper and should be withdrawn.

Accordingly, Harmer does not anticipate, or render obvious, present claim 1 or any of claims 3, 7 and 8, each of which depends directly or indirectly from claim 1. Applicants request withdrawal of the rejection and allowance of the claims.

**V. Each of Claims 5, 9 and 10 is Patentable over Harmer in view of Jansen**

Claims 5, 9, and 10 are rejected under § 103 over Harmer in view of Jansen (US 5,795,556). The Examiner asserts that Harmer and Jansen are utilized to form gels, and, therefore, that the combination of Harmer and Jansen is in itself *prima facie* obvious. Applicants respectfully traverse the rejection.

Claim 10 has been cancelled without prejudice in the amendments above. Accordingly, the rejection of claim 10 is moot.

Claim 5 depends directly from claim 1 and is patentable over the combination of Harmer and Jansen. As discussed above Harmer fails to anticipate claim 1 or render claim 1 obvious. Jansen fails to cure the deficiencies of Harmer. Jansen involves simply silica xerogels. Jansen does not teach or suggest interpenetrating organic and inorganic networks. Therefore, the combination of Harmer and Jansen fails to render claim 5 obvious.

With reference to claim 9, the combination of Harmer and Jansen fails to teach or suggest an aerogel consisting of organic and inorganic networks interpenetrating on a scale of no more than 100 nm with a density of no more than 0.6 g/cm<sup>3</sup>. Notably, for example, as discussed above, there is no disclosure in Harmer, with or without Jansen, of aerogel consisting of the required interpenetrating organic and inorganic networks on a scale of no more than 100 nm. The Examiner also has not identified objective evidence that the

combination of Harmer and Jansen inherently discloses, teaches or suggests the aerogel with organic and inorganic interpenetrating networks defined by claim 9. Thus, the rejection is improper.

Moreover, the Harmer and Jansen citations are not properly combined. Even though each of Harmer and Jansen may be related to materials involving gels, such a relationship does not automatically render the citations combinable. Instead, the test for suggestion or motivation to combine citations requires evaluation of "the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). The Examiner has failed to identify any suggestion or motivation, within either of the two citations themselves, to combine their selected portions and to modify them in order to arrive at the subject matter of either of claims 5 or 9.

Because the combination of Harmer and Jansen fails to disclose, teach or suggest all the elements of either of claims 5 or 9, and because Harmer and Jansen are not properly combinable, the rejection is improper and should be withdrawn.

**VI. Claims 4, 6 and 11-19 are Patentable over Harmer in view of Jansen and Geiss**

Claims 4, 6, and 11-19 are rejected under § 103 over Harmer in view of Jansen and Geiss (US 5,948,314). Applicants respectfully traverse the rejection.

In the amendments above, each of claims 11, 14 and 17-19 have been cancelled without prejudice. Thus, the rejection of these claims is now moot.

As discussed above, Jansen fails to cure the deficiencies of Harmer. Thus, each of claims 4, 6, 12, 13, 15 and 16 is patentable over the combination of Harmer and Jansen.

Geiss also fails to cure the above-discussed deficiencies of Harmer. Geiss does not teach or suggest interpenetrating organic and inorganic networks; instead, Geiss uses aerogel particles formed prior to mixing with a polymer binder. Moreover, it is not clear how the pre-formed aerogel particles of Geiss could be used in the process of Harmer. Certainly there

is no motivation identified within any of the citations for selectively combining and modifying their various process aspects to arrive at the present invention. Each of claims 4, 6, 12 and 13 depends directly or indirectly from claim 1 or incorporates it by reference and, therefore, is patentable over the combination of Harmer, Jansen and Geiss for at least the reasons stated above. Moreover, each of claims 4, 6, 12 and 13 is further patentable in view of its additional elements or further definition of elements.

Similarly, each of claims 15 and 16 depends directly or indirectly from claim 9 or incorporates it by reference and, therefore, is patentable over the combination of Harmer, Jansen and Geiss for at least the reasons stated above. Moreover, each of claims 15 and 16 is further patentable in view of its additional elements or further definition of elements.

Because the combination of Harmer, Jansen and Geiss fails to disclose, teach or suggest the subject matter of any of claims 4, 6, 12, 13, 15 and 16, and because the citations are not properly combinable, each of claims 4, 6, 12, 13, 15 and 16 is patentable over the citations. Thus, the rejection is improper and should be withdrawn.

#### **VII. Claim 2 is Patentable over Harmer in view of Pekala**

Claim 2 was rejected in the Final Office Action over Harmer in view of Pekala.

In the Response to the Final Office Action, Applicants traversed the rejection and presented arguments demonstrating that claim 2 was patentable over Harmer in view of Pekala.

In the Advisory Action, the Examiner agreed that claim 2 was patentable over the combination of Harmer and Pekala (see page 5, third full paragraph of the Advisory Action). Applicants appreciate the Examiner acknowledging that claim 2 is patentable over the combination of Harmer and Pekala. In addition, each of new claims 29 and 30 is similar to claim 2 and is believed to be patentable over all citations of record. Applicants respectfully request allowance of the claims.

**VIII. Claim 2 is Patentable over Harmer in view of Mager**

Claim 2 was rejected in the Final Office Action over Harmer in view of Mager.

In the Response to the Final Office Action, Applicants traversed the rejection and presented arguments demonstrating that claim 2 was patentable over Harmer in view of Mager.

In the Advisory Action, the Examiner agreed that claim 2 was patentable over the combination of Harmer and Mager (see page 5, fourth full paragraph of the Advisory Action). Applicants appreciate the Examiner acknowledging that claim 2 is patentable over the combination of Harmer and Mager. In addition, each of new claims 29 and 30 is similar to claim 2 and is believed to be patentable over all citations of record. Applicants respectfully request allowance of the claims.

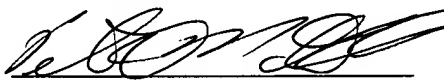
**IX. Conclusion**

For the foregoing reasons, all claims pending in the application are in condition for allowance. Applicants respectfully request allowance of all claims.

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Respectfully submitted,  
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